

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A high-speed fluid jet blocker for selectively blocking a high-speed fluid jet comprising:

a first electromagnet assembly having a selectively energizable coil, such that energizing the coil will induce a magnetic field;

a blocking bar having an area of high magnetic permeability, the blocking bar being pivotable to at least either an open position or a blocking position by application of the magnetic field generated by the coil upon the area of high magnetic permeability; and

wherein the blocking bar is disposed away from the high-speed fluid jet when the blocking bar is in the open position and blockingly intersects the high-speed fluid jet when the blocking bar is in the blocking position.

2. The high-speed fluid jet blocker of Claim 1, wherein the blocking bar is comprised of a first end having the area of high magnetic permeability and a second end having a blocking element, wherein the second end of the blocking bar is disposed away from the high-speed fluid jet when the blocking bar is in the open position and wherein the blocking element of the second end intersects the high-speed fluid jet when the blocking bar is in the blocking position.

3. The high-speed fluid jet blocker of Claim 2, further comprising a second electromagnet assembly having a selectively energizable coil such that energizing the coil will induce a magnetic field, wherein, when the blocking bar is pivoted to the open position, the first end is pivoted toward the first electromagnet assembly, and when pivoted to the blocking position, the first end is pivoted toward the second electromagnet assembly, by application of the magnetic fields generated by the coils upon the area of high magnetic permeability of the blocking bar.

4. The high-speed fluid jet blocker of Claim 2, wherein the blocking element is comprised of sapphire.

5. The high-speed fluid jet blocker of Claim 2, wherein the blocking element is comprised of carbide.

6. The high-speed fluid jet blocker of Claim 2, wherein the blocking element is spherical in shape and rotatably mounted on the second end of the blocking bar, wherein the impingement of the fluid jet upon the surface of the ball imparts a rotational movement to the blocking element.

7. The high-speed fluid jet blocker of Claim 1, further comprising a biasing element, positioned to bias the blocking bar to either the open position or the blocking position, wherein the selective de-energizing of the first electromagnet assembly will allow the biasing element to pivot the blocking bar to either the open position or the blocking position.

8. The high-speed fluid jet blocker of Claim 1, wherein a current applied to the first electromagnet assembly is selectively reversible in polarity to impart a corresponding reverse in polarity of the magnetic field.

9. The high-speed fluid jet blocker of Claim 1, wherein the first electromagnet assembly is selectively energizable between a first polarity and a second polarity, wherein when the first electromagnet assembly is selectively energized to the first polarity, the blocking bar is pivoted to the open position, and when the first electromagnet assembly is selectively energized to the second polarity, the blocking bar is pivoted to the closed position.

10. The high-speed fluid jet blocker of Claim 1, further comprising a housing containing the first electromagnet assembly, wherein the housing is fitted with a cooling fluid inlet and a cooling fluid outlet, wherein a cooling fluid may be introduced into the housing through the cooling fluid inlet, and exit through the cooling fluid outlet, to cool the first electromagnet assembly contained within the housing.

11. The high-speed fluid jet blocker of Claim 1, wherein the blocking bar is pivoted between a first and a second limit stop, so that when the blocking bar is against

the first limit stop, the blocking bar is in the open position and when against the second limit stop, the blocking bar is in the blocking position.

12. The high-speed fluid jet blocker of Claim 11, wherein:

the first or the second limit stop is comprised of the first electromagnet assembly;

and

wherein a portion of the electromagnet assembly extends into the rotational path of the blocking bar, blocking the further rotation of the blocking bar.

13. The high-speed fluid jet blocker of Claim 2, wherein the blocking bar is further comprised of a support pivot, wherein the support pivot is disposed between the first end and the second end of the blocking bar.

14. A high-speed fluid jet blocker for selectively blocking a high-speed fluid jet comprising:

a blocking bar having an area of high magnetic permeability, the blocking bar being pivotable to either an open position or a blocking position by application of a magnetic field upon the area of high magnetic permeability;

wherein the blocking bar is disposed away from the high-speed fluid jet when the blocking bar is in the open position and blockingly intersects the high-speed fluid jet when the blocking bar is in the blocking position; and

at least a first actuator capable of pivoting the blocking bar to the open position or the blocking position by selectively generating the magnetic field.

15. The high-speed fluid jet blocker of Claim 14, further comprising a second actuator capable of pivoting the blocking bar by selectively generating the magnetic field.

16. The high-speed fluid jet blocker of Claim 14, further comprising a second actuator, wherein the actuator is a biasing element capable of pivoting the blocking bar.

17. The high-speed fluid jet blocker of Claim 16, wherein the biasing element is arranged to bias the blocking bar to either the open position or the blocking position, wherein the selective generating of the magnetic field by the first actuator will allow the

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biasing element to pivot the blocking bar to either the open position or the blocking position.

18. The high-speed fluid jet blocker of Claim 14, wherein the blocking bar is pivoted between the open position and the blocking position by selectively reversing the polarity of a current used in generating the magnetic field by the first actuator.

19. The high-speed fluid jet blocker of Claim 14, further comprising a housing containing the first actuator, wherein the housing is fitted with a cooling fluid inlet and a cooling fluid outlet, wherein a cooling fluid may be introduced into the housing through the cooling fluid inlet to cool the actuator and exit the housing by the cooling fluid outlet.

20. The high-speed fluid jet blocker of Claim 14, wherein the blocking bar is further comprised of a blocking element that is aligned to intersect the high speed fluid jet when the blocking bar is in the blocking position.

21. The high-speed fluid jet blocker of Claim 20, wherein the blocking element is comprised of sapphire.

22. The high-speed fluid jet blocker of Claim 20, wherein the blocking element is comprised of carbide.

23. The high-speed fluid jet blocker of Claim 14, wherein the blocking bar further comprises a support pivot, wherein the support pivot is disposed between the area of high magnetic permeability and a point on the blocking bar wherein the high-speed fluid jet impacts the blocking bar when the blocking bar is in the blocking position.

24. A high-speed fluid jet blocker for selectively blocking a high-speed fluid jet comprising;

a housing;

a blocking bar comprising a first portion comprised of materials having a high magnetic permeability;

a mounting assembly for pivotally mounting the blocking bar to the housing;

a first electromagnet assembly for pivoting the blocking bar between an open position and a blocking position, wherein a second portion of the blocking bar blockingly intersects the high speed fluid jet when the blocking bar is in the blocking position and when in the open position, the blocking bar is oriented so that the blocking bar is out of the path of the high-speed fluid jet; and

wherein the first electromagnet assembly is comprised of a selectively-energizable electromagnet coil capable of inducing a magnetic field of sufficient strength to interact with the materials of high magnetic permeability of the first portion of the blocking bar, thereby pivoting the blocking bar to at least either the open position or the blocking position.

25. The high-speed fluid jet blocker of Claim 24, further comprising a biasing element that biases the blocking bar to either the open position or the blocking position.

26. A high-speed fluid jet blocker for selectively blocking a high-speed fluid jet comprising:

a first and a second electromagnet assembly each having a selectively-energizable coil such that energizing the coil will induce a magnetic field;

a blocking bar comprised of a first end having an area of high magnetic permeability and a second end having a blocking element, wherein the blocking bar is pivotable between an open position, wherein the first end is pivoted towards the first electromagnet assembly, and a blocking position, wherein the first end is pivoted towards the second electromagnet assembly, by application of the magnetic fields generated by the coils upon the area of high magnetic permeability of the blocking bar; and

wherein the second end of the blocking bar is disposed away from the high-speed fluid jet when the blocking bar is in the open position and wherein the blocking element of the second end intersects the high-speed fluid jet when the blocking bar is in the blocking position.